



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,042	01/09/2004	Mou-Shiung Lin	085027-0104	8665

89518 7590 02/25/2011
McDermott Will & Emery LLP
600 13th Street, NW
Washington, DC 20005-3096

EXAMINER

JACKSON JR, JEROME

ART UNIT	PAPER NUMBER
----------	--------------

2815

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

02/25/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mweipdocket@mwe.com
SIP_Docket@mwe.com

Office Action Summary	Application No. 10/755,042	Applicant(s) LIN ET AL.	
	Examiner Jerome Jackson Jr.	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 163,164,166-171,173 and 176-210 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 163,164,166-171,173 and 176-210 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/13/10;12/13/10;12/13/10</u> | 6) <input type="checkbox"/> Other: _____ |

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 163-164, 168, 171, 173, 176 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger 6,396,148 in view of Gupta 6,383,858.

Eichelberger as previously, disclosing a first insulating layer 104 coplanar with dies 102; a second insulating layer 106 over both the first insulating layer and dies; a patterned metal layer 108; and a third insulating layer 112. The difference between Eichelberger and claim 163 is a comb shaped capacitor. This difference is not patentable because Gupta suggests a comb shaped capacitor in upper level metallization to enable circuitry with substantial capacitance. It would have been obvious to have engineered an interdigitated or "comb-shaped" capacitor structure in an Eichelberger type device to enable circuitry requiring large capacitance in a small area.

Alternately, it would have been obvious to have practiced circuit dies as Gupta with comb-shaped capacitors in an isolation scheme as Eichelberger in order to plate metal to the top level bond pads of the several ICs, as in Eichelberger.

Claims 163-164 are obvious structure. Claim 168 is rejected as copper metal is disclosed by Eichelberger and obvious for metallization regardless of the method of making the copper. Note the previously recited product by process caselaw.

Claim 171 is rejected as Eichelberger discloses multiple solder bumps 110.

Claim 173 is rejected because Eichelberger discloses gold bumps (col. 8 and 9).

Claim 176 is rejected because Eichelberger discloses a substrate 101.

Claims 166-170 and 178 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger with Gupta and further in view of Cole 5,745,984.

As previously Cole discloses BCB and polyimide to form multilevel insulating films. For the advantages discussed in Cole it would have been prima facie obvious to practice similar materials in a device as Eichelberger with Cole. Claims 166, 167, 169 and 170 are obvious structure. In regard to claim 168, Cole also discloses electroplated copper for conductors. In regard to claim 178 Cole discloses epoxy material.

Claims 177 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger with Gupta and further in view of Wagner 5,196,377.

In regard to a silicon substrate, Wagner suggests a silicon substrate for the advantages of material matching to silicon dies as disclosed in Eichelberger, and further for increasing the density of metal interconnections, and for increasing the yield of good devices. Claim 177 is obvious structure.

Claims 179, 184, 187-194 and 196-199, 201,203, 205, 206 and 208-210 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger with Gupta and further in view of Wachtler 6,707,124.

In regard to connecting two pads on a single die, Wachtler in figure 22 discloses such configuration, which would have been obvious for Eichelberger in order to connect transistors or other devices on a single chip with adjacent metallization. Claim 179 is obvious structure.

In regard to claim 184 Gupta discloses multiple insulation layers.

Art Unit: 2815

In regard to claims 187-189, labels as "ground", "power", "signal", etc. do not distinguish over the metalizations of the applied art labeled in a similar manner. Further such busses are fundamental in the art and would have been obvious for the applied references.

In regard to claim 190 and 192 "a capacitor" can form a filter circuit or be labeled a "filter".

In regard to claim 191 the wiring structure of the capacitor or other wirings of the applied art comprises inductance and can be labeled "inductor". There are no specific inductance structures claimed to distinguish over the applied art.

Likewise, in regard to claim 193, all wires have resistance and the wires of the applied art can be labeled "resistor" as no distinguishing resistor structure is claimed.

In regard to claim 194 there is a "substrate" 101 in Eichelberger.

In regard to claim 196, Gupta discloses the capacitor directly over the semiconductor substrate and insulation layers.

Claim 197 is rejected as per claim 179, the label "ground piece" not distinguishing over the metallization of Wachtler similarly labeled. Claims 198 and 199, 201, 203, 205, 206, and 208-210 are also rejected as above.

Claims 180-183, 185, 186, 200, 202 and 204 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger with Gupta and Wachtler and further in view of Cole.

As above, Cole suggests epoxy/polyimide for insulation layers. Claims 180-183, 185, 186, 200, 202, 204, are obvious structure.

Claims 195, 207 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger with Gupta and Wachtler and further in view of Wagner.

As above, Wagner suggests silicon substrate for increased density of interconnections and better thermal dissipation of unwanted heat, etc. Claims 195 and 207 is obvious structure.

Applicant's arguments filed 12/13/10 have been fully considered but they are not persuasive. Applicant argues the capacitor of Gupta would not be suggested for the device of Eichelberger because the processes would not be compatible.

First, the claims are drawn to structure rather than a process. Regardless of the process of manufacture, packages with multiple dies including comb-shaped capacitors are obvious from the suggestions of the references, as integrated capacitors are essential for small IC circuitry requiring large capacitances, such as the circuit of Gupta.

Secondly, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). There is clear motivation for incorporating large comb-shaped capacitors in integrated circuitry as modern circuits such as Gupta require large capacitances and comb-shaped capacitors enable large capacitance in IC design. There is also clear motivation for practicing multiple ICs as Gupta in a packaging

Art Unit: 2815

scheme as Eichelberger for enabling electroless plating of final bond pads.

Planarization is also obvious from both Gupta and Eichelberger.

Moreover, the integrated circuits 102 of Eichelberger can be considered to represent both the silicon die material and upper level insulation and metallization of interconnect wires over the die, in the fashion of a die and multilevel metallization as in Gupta. The final bond pad metallization is the relevant top metal level of Eichelberger, or Eichelberger with Gupta. It would not have been unobvious to practice multilevel metalization over a die of Eichelberger from Gupta. In fact Gupta shows how to enable multilevel metallization with comb capacitor structure over dies. Together the references suggest integrated circuits with comb-shaped capacitors and isolation material around integrated circuits in a package as Eichelberger with Gupta.

On page 14 applicant argues Gupta does not teach a capacitor over the die. This is not persuasive as Gupta discloses capacitor 100 over silicon die material 418. The comb capacitor is also part of the metallization over the die. Taken together, the references suggest capacitors in metallization over dies in a planarized multichip package.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

Art Unit: 2815

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Jackson Jr. whose telephone number is 571-272-1730. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerome Jackson Jr./
Primary Examiner, Art Unit 2815

Application/Control Number: 10/755,042
Art Unit: 2815

Page 8